



Energy mergers: An economic perspective



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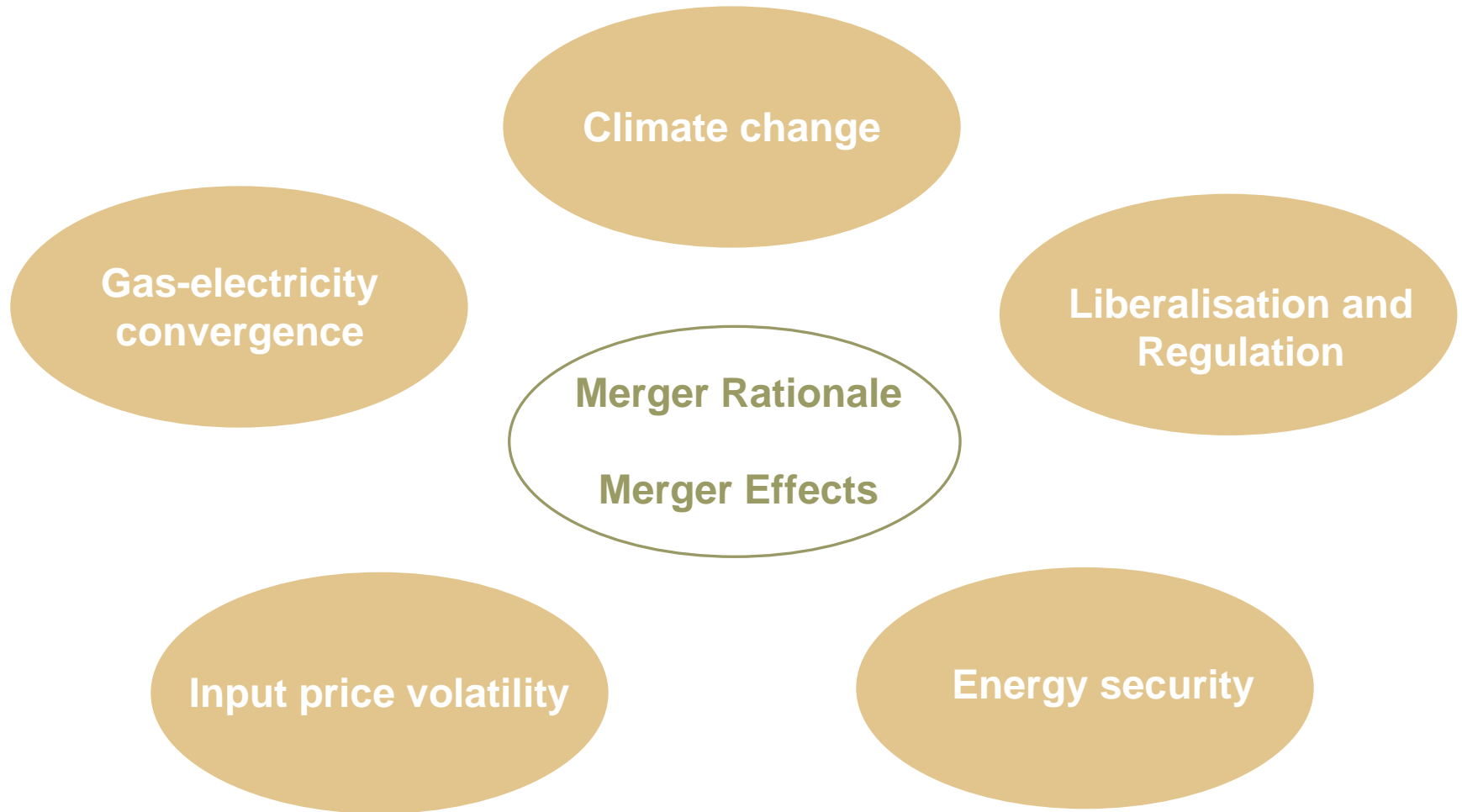
Topics

- **Energy mergers: overall context**
- **Unilateral effects in power markets**
- **Vertical effects**
- **Remedy design**

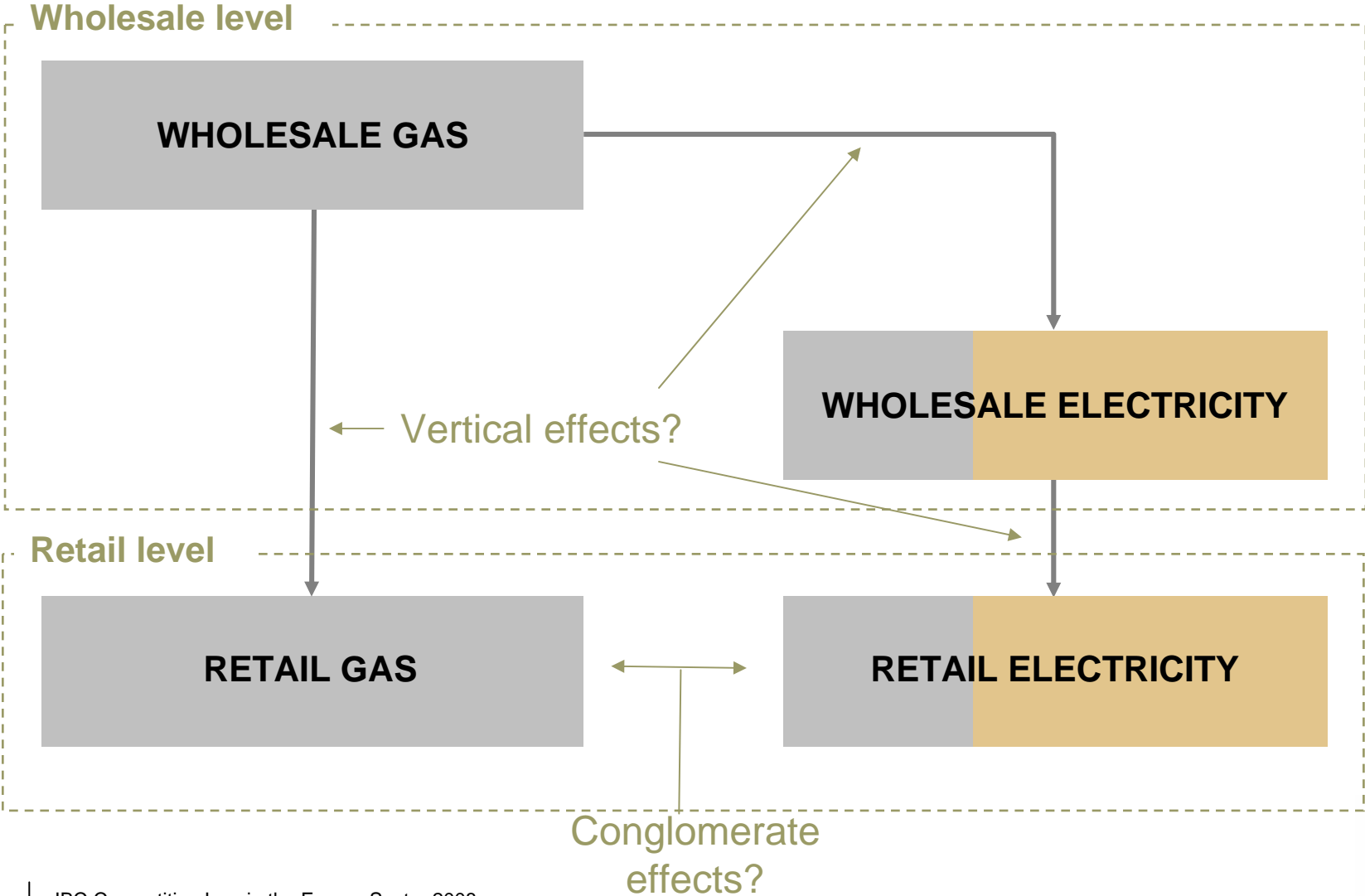
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Context



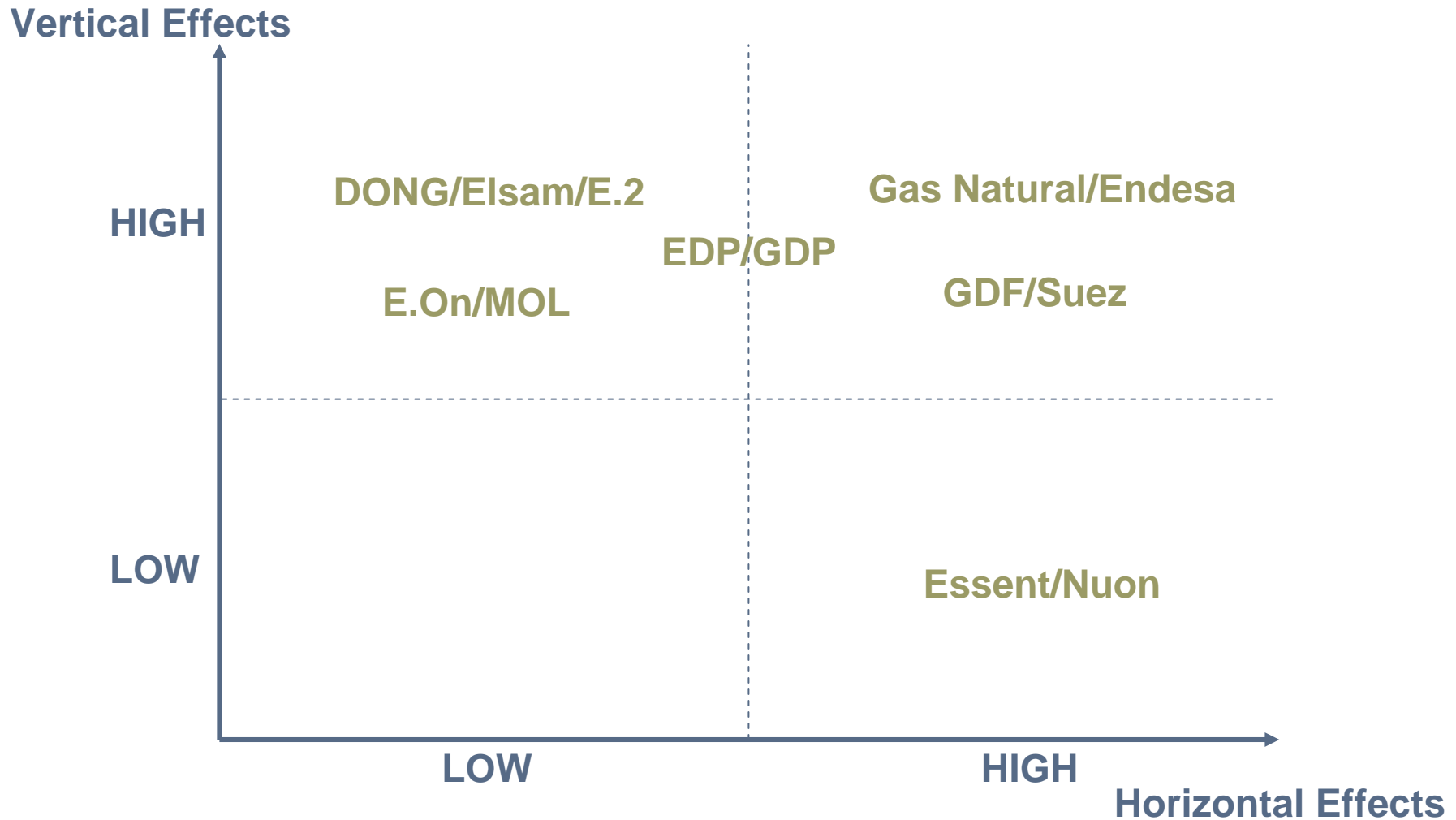
Structure



Recent European examples

	Year	Market	Jurisdiction	Outcome
<i>EDP/GDP</i>	2004/05	Portugal	Brussels	x
<i>E.On/MOL</i>	2005	Hungary	Brussels	✓
<i>Gas Natural/ Endesa</i>	2005/06	Spain	Spain	x / ✓
<i>Dong/Elsam/ E.2</i>	2006	Denmark	Brussels	✓
<i>GDF/Suez</i>	2006	Belgium	Brussels	✓
<i>Essent/Nuon</i>	2007	Netherlands	Netherlands	?
<i>Gas Natural/Union Fenosa</i>	2008+	Spain	Spain	?
<i>EDF/British Energy</i>	2008+	U.K.	Brussels	?

Taxonomy of recent cases*



* Based on assessment by competition authorities

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Are power markets “special”?

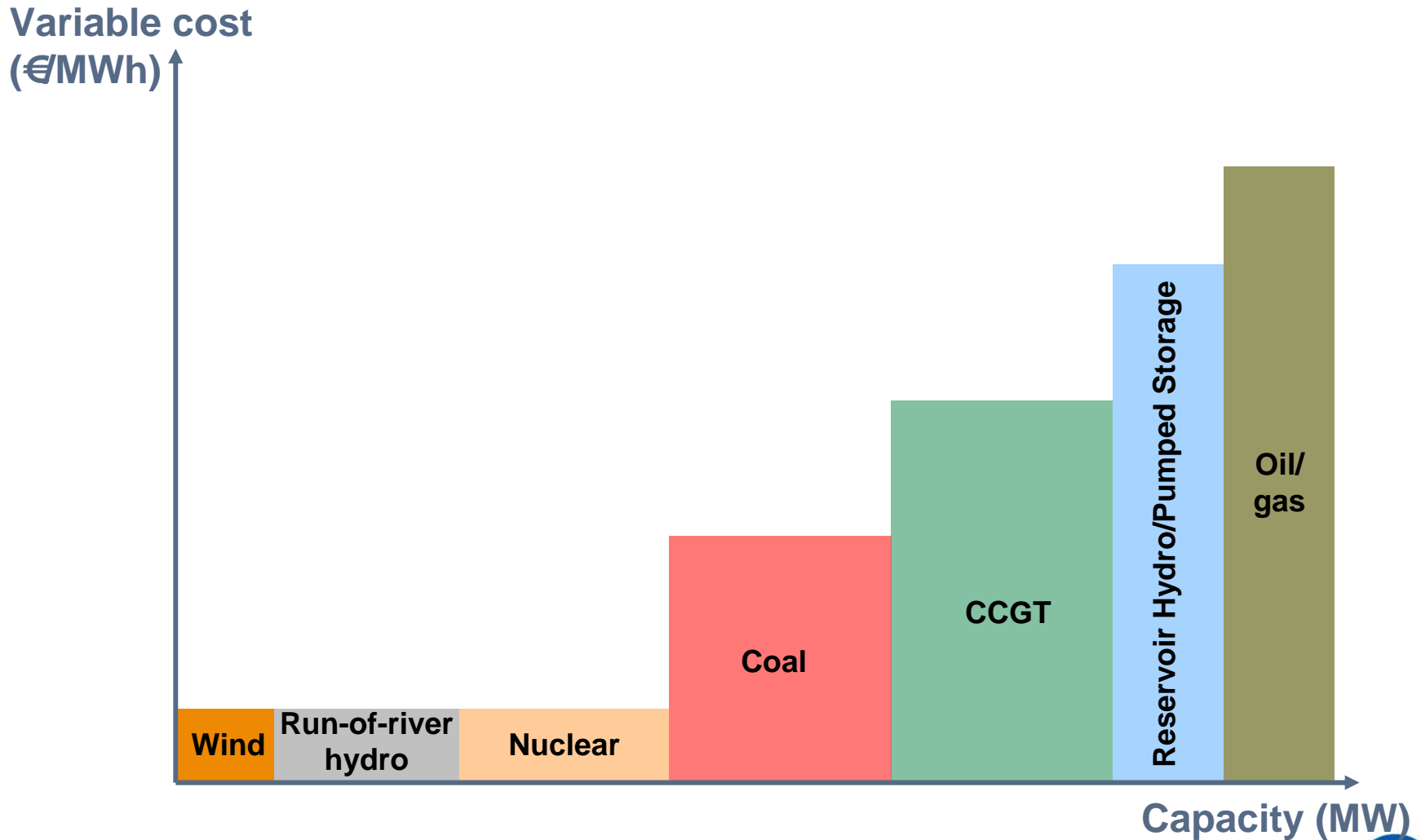
Features of the market

- Very inelastic demand
- Volatile demand across short time periods (e.g. a day)
- Lack of storability
- Significant differences in generation technologies
- Uniform pricing
- Transmission constraints

Implications for merger effects

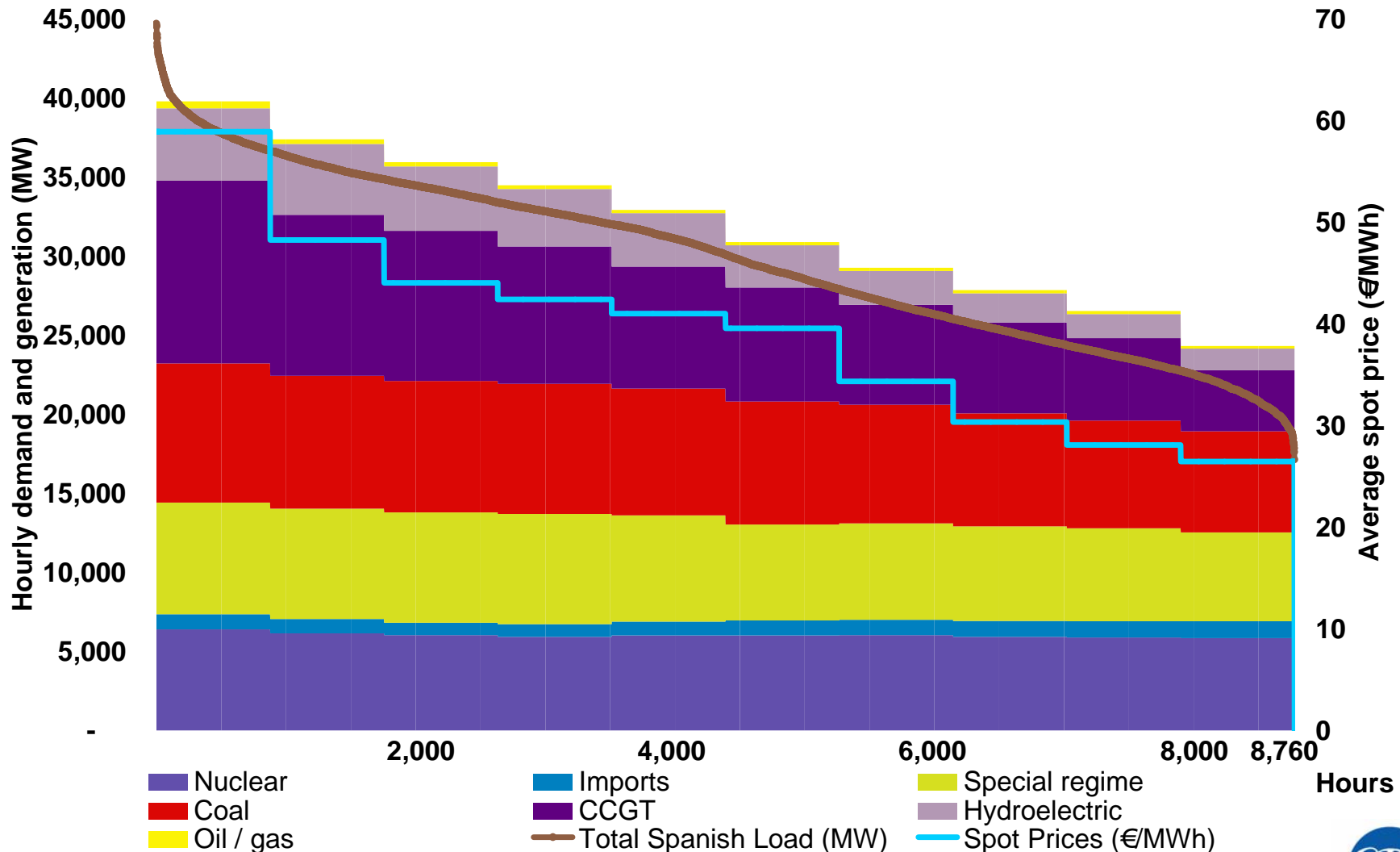
- Price elasticity may not constrain merger effects
- Competitive conditions change significantly across hours
- Market definition complex (product and geographic)
- Limited overlap can generate material price effects

Complexity of cost structure...



... and generation by hour

Spanish load and price duration curve, 2007

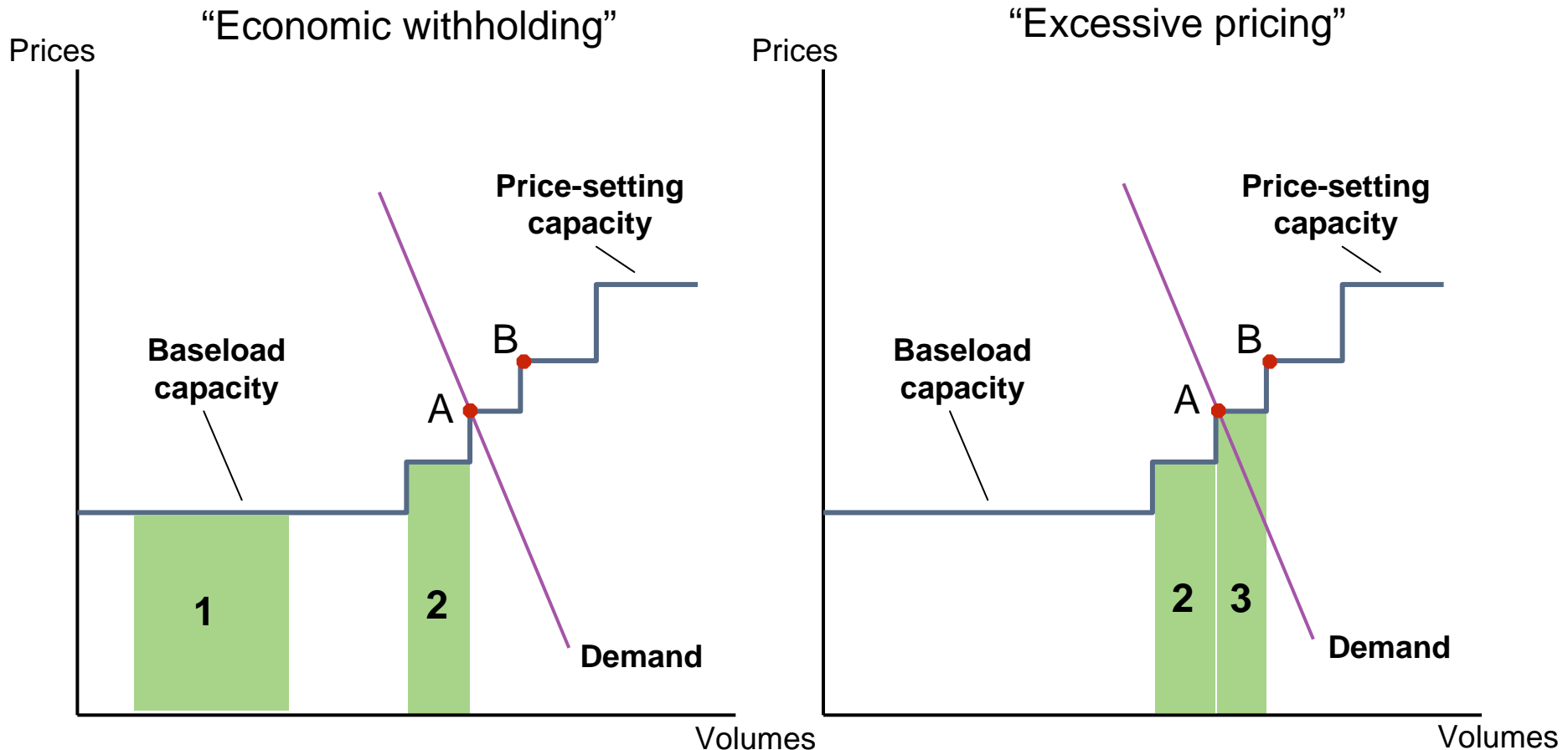


Source: IESE SP-SP Report on Competition and Regulation in the Spanish Energy Market, forthcoming, 2008; REE.



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Two broad types of unilateral effects



Capacity owned by merging parties
 A = pre-merger prices
 B = post-merger prices

...in practice these are two aspects of the same basic economic strategy:

profit-maximising conduct by portfolio generators

Predicting unilateral effects: the economist toolkit

Structural Indicators

Concentration measures

- As in any market, depend on markets being well-defined
- e.g. should baseload capacity always be included in the definition of the relevant market for wholesale electricity?

Alternative indicators

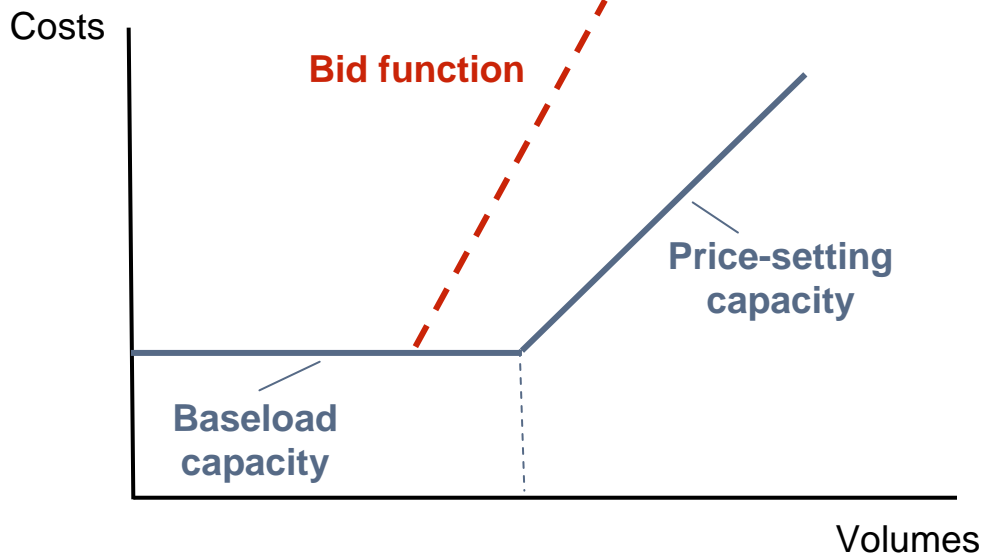
- *Pivotal* and *Residual* Supplier indices
- Measure how frequently a generator faces a residual demand which has a perfectly inelastic segment
- Neither *necessary* nor *sufficient* to exercise market power
- Link to merger effects unclear

Merger Simulations

- In principle most suitable technique to capture complexity of the market
- Data-intensive but good data on costs and load typically available
- Sensitive to economic modelling assumptions:
 - *Quantity competition (Cournot)*
 - *Discrete mark-ups*
 - *Supply functions*
- Need “reality check”
- Need to be able to calibrate pre-merger outcome using realistic input assumptions

Merger simulation: a simplified example

A. Cost structure



B. Market shares

Case I

	Baseload	Price setting
Firm A	10%	10%
Firm B	10%	10%
Firm C	20%	20%
Firm D	20%	20%
Fringe	40%	40%

Case II

	Baseload	Price setting
Firm A	0%	20%
Firm B	0%	20%
Firm C	25%	15%
Firm D	25%	15%
Fringe	50%	30%

C. Simulated price effects of merger of A and B*

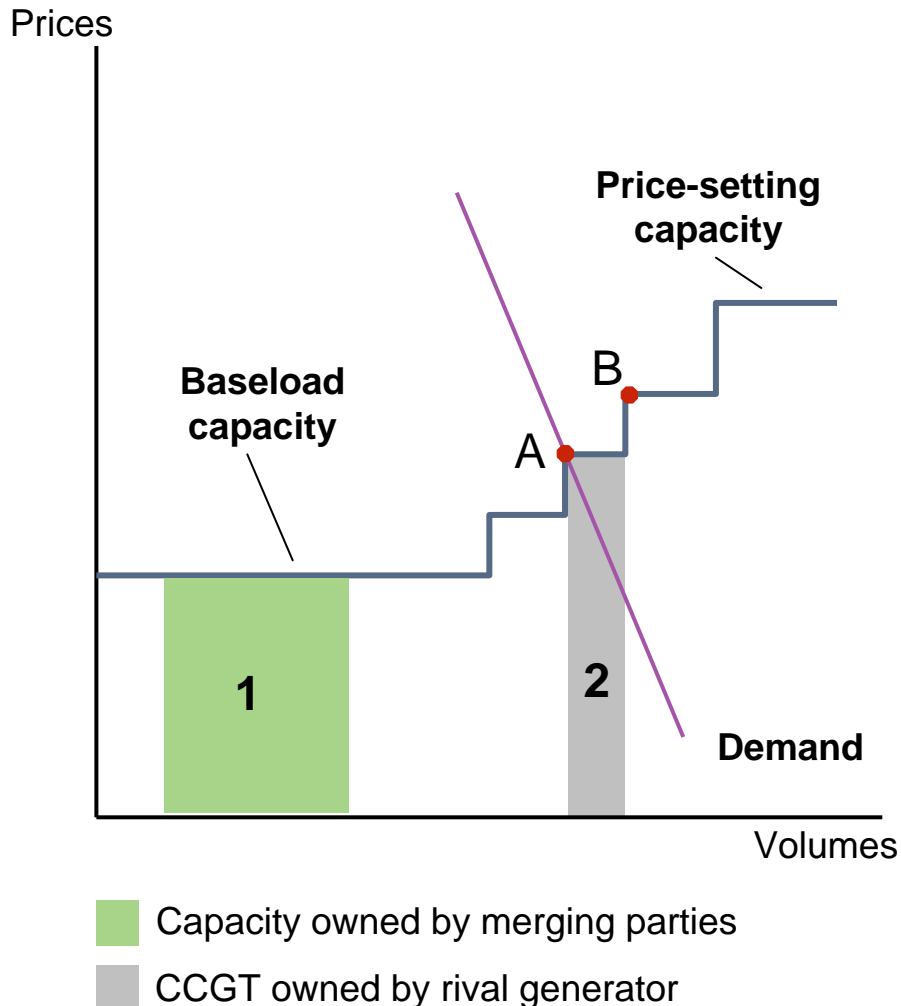
	Elasticity = 0.1	Elasticity = 0.2
Case I	3.4%	2.4%
Case II	8.1%	5.6%

* % increase, simulated using a Linear Supply Function model. Assumes baseload cost = 0

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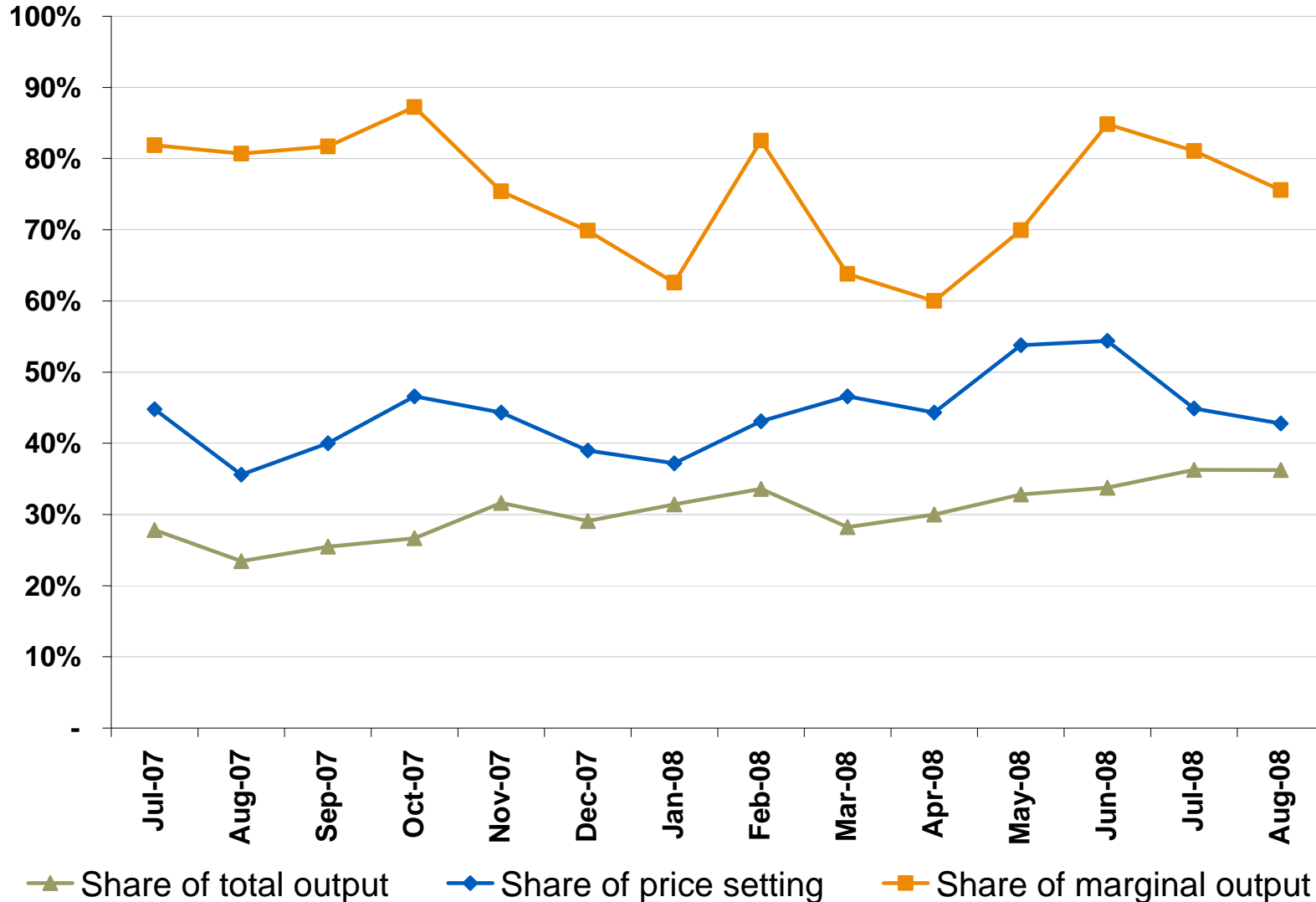
Input foreclosure in energy mergers



- **A strategy of raising rivals' costs by an integrated gas-electricity producer can be profitable if**
 - gas-fired plants are price-setting
 - the vertically integrated generator also has significant infra-marginal capacity
- **The strategy is similar to a horizontal withholding strategy**
 - Is the lost (upstream) margin on the price-setting plant offset by the gain on baseload capacity?
 - Horizontal and vertical strategies interact (effect is *not* cumulative)
- **Net impact on consumers depends on merger efficiencies**
 - Gas-electricity integration can eliminate double-margins, depending on structure of gas contracts pre-merger

Gas is increasingly price-setting in generation

Role of CCGTs in the Spanish spot electricity market



Source: Spanish electricity market and transmission system operators

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Remedies: Case studies

	EDP/GDP*	Gas Natural/ Endesa**	GDF/Suez
Vertical Unbundling in Gas	Yes LNG and Storage	None	Yes Fluxys (partially)
Gas Release	Yes (limited)	Yes	Sale of Distrigaz
CCGT Divestment	Lease	Yes (1.2GW min)	Yes (SPE stake)
Other Generation Divestment	Limited	Yes	No
Retail Measures	Yes (gas networks)	Yes (clients and networks)	Yes (SPE stake)

* Last set of remedies offered by the parties

** Conditions imposed by Spanish Government

Economic issues in remedy design

Addressing horizontal effects

- **Impact of generation divestments depends on size and type of assets**
 - *Essent/Nuon*: NMa/Brattle Report in 2006 estimated that divesting 1.9GW (equivalent to 50% of overlap) removed only 60% of predicted price effects
 - *Gas Natural/Endesa*: only 3.1GW of coal/oil divestments offered initially, whilst final conditions increased this to 4.3GW (with at least 1.2GW of CCGT)
 - In general, divestment of price-setting plants more effective
- **Virtual divestments (VPPs) are an alternative**
 - Impact depends on auction design: frequency; size; and type of “virtual” plants that are offered to the market
 - VPP best suited to mimic baseload divestments
- **Retail overlap can be harder to fix**
 - Sales of stakes and/or of regional networks (with associated customers) easier to implement
 - Access measures can substitute for horizontal remedies

Economic issues in remedy design

Addressing vertical foreclosure

- **Gas release programmes can in principle address the *ability* to raise rivals' costs, but design issues important**
 - Frequent auctions may allow merging parties to keep gas prices high post-merger, and foreclose entry in spite of gas release programme
 - Quantity and modalities of gas release need to be adjusted accordingly
- **Generation divestments can address *incentives* to foreclose, and can play important complementary role**
- **Vertical unbundling may be warranted if the merger implies that prospects for wholesale and/or retail competition are diminished through loss of actual/potential entry**

Conclusions

- **Growing body of recent precedents will inform approach to future energy mergers**
- **Volatile market conditions make it harder to predict impact**
- **Evaluating horizontal effects in generation markets can be particularly complex (for mergers of intermediate size)**
- **Most merger effects in energy markets can be addressed through appropriate remedy design**

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